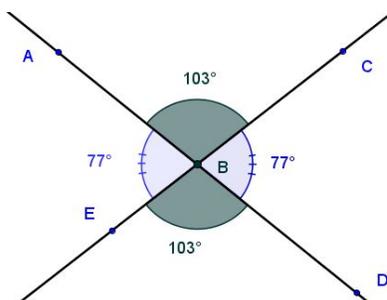


## Student Activity Theorem 1

Use in connection with interactive file "Theorem 1" on the Student's CD.



1. Drag the point C to make the measure of angle CBA equal to  $90^\circ$ . What do you notice about the measure of the angle EBD? \_\_\_\_\_
  
2. When the measure of the angle CBA is  $90^\circ$  What do notice about the measures of the angles EBD, ABE and CBD.  
\_\_\_\_\_
  
3. What conclusion can be drawn from adding all the angles in question 2?  
\_\_\_\_\_
  
4. Drag the point C to make the measure of the angle CBD equal to  $70^\circ$ . Write down the measures of the angles ABE, ABC and EBD.  
ABE = \_\_\_\_\_, ABC = \_\_\_\_\_ and EBD = \_\_\_\_\_
  
5. Drag the point C to make the measure of the angle ABE  $60^\circ$ . Is the measure of the angle CBD the same? \_\_\_\_\_  
What is the measure of the angle ABC? \_\_\_\_\_ Is the measure of the angle EBD equal to the measure of the angle ABC? \_\_\_\_\_
  
6. Drag the point C to make the measure of the angle ABC  $130^\circ$ . Is the measure of the angle EBD the same? \_\_\_\_\_  
What is the measure of the angle ABE? \_\_\_\_\_ Is the measure of the angle CBD equal to the measure of the angle ABE? \_\_\_\_\_
  
7. By dragging the point C make the measure of the angle ABC  $93^\circ$ . When you add the measure of angle ABC to the measure of angle CBD what answer do you get? \_\_\_\_\_  
What does this tell you about the points A, B and D? \_\_\_\_\_

8. Make the measure of the angle  $EBD = 100^\circ$ . What are the measures of the following angles (i)  $ABC =$  \_\_\_\_\_ (ii)  $EBA =$  \_\_\_\_\_ (iii)  $CBD =$  \_\_\_\_\_ What does this show you? \_\_\_\_\_

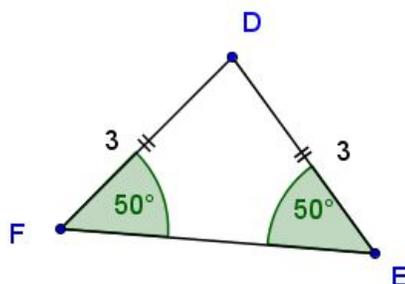
When you add the measures of the angles  $EBD$ ,  $ABE$ ,  $ABC$  and  $CBD$  you get \_\_\_\_\_

9. Click on the Tick Box on the interactive file to reveal the wording of this theorem.

Did you come to this conclusion? \_\_\_\_\_

## Student Activity Theorem 2

Use in connection with interactive file “Theorem 2” on the Student’s CD.



1. Drag the point D to make the measure of the angle DEF  $50^\circ$ .  
 What is the measure of the angle DFE? \_\_\_\_\_. Are the two angles equal in measure? \_\_\_\_\_  
  
 Write down the lengths of the sides DE and DF. Are these lengths equal? \_\_\_\_\_
2. Drag the point D to make the length of the side DE = 4.  
 What is the length of the side DF? \_\_\_\_\_.  
 Are the two sides equal? \_\_\_\_\_  
 Write down the measures of the angles DEF and DFE.  
 DEF = \_\_\_\_\_, DFE = \_\_\_\_\_  
 Are the measures of the two angles equal? \_\_\_\_\_
3. Drag the point D to make the measure of the angle DFE =  $70^\circ$ . What is the measure of the angle DEF? \_\_\_\_\_. Are the two angles equal in measure? \_\_\_\_\_  
 Write down the lengths of the sides DF and DE. Are these lengths equal? \_\_\_\_\_
4. Drag the point D to make the length of the side DF = 8.  
 What is the length of the side DE? \_\_\_\_\_.  
 Are the two sides equal? \_\_\_\_\_  
 Write down the measures of the angles DFE and DEF.  
 DFE = \_\_\_\_\_, DEF = \_\_\_\_\_  
 Are the measures of the two angles equal? \_\_\_\_\_
5. What conclusion can be drawn from the answers in questions 1, 2, 3, and 4 when  
 (i) the sides are equal:

Conclusion \_\_\_\_\_

(ii) the angles are equal:

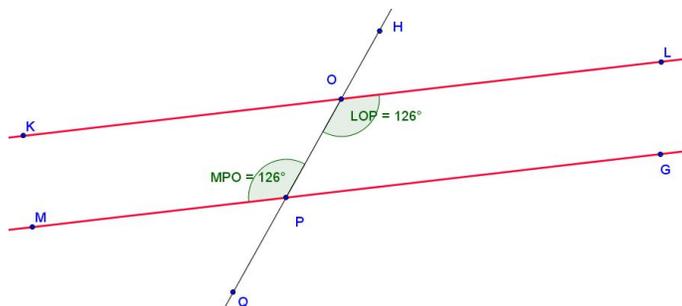
Conclusion \_\_\_\_\_

6. Click on the Tick Box 1 and Tick Box 2 on the interactive file to reveal the wording of this theorem and the converse of this theorem.

Did you come to these conclusions? \_\_\_\_\_.

## Student Activity Theorem 3

Use in connection with interactive file “Theorem 3” on the Student’s CD.



1. What do you notice about the measure of the angles LOP and MPO?  
 \_\_\_\_\_  
 Drag the point H to make the measure of the angle LOP =  $100^\circ$  .  
 Write down the measure of the angle MPO. MPO = \_\_\_\_\_  
 Are the measures of the two angles LOP and MPO equal in measure? \_\_\_\_\_.
  
2. Drag the point H to make the measure of the angle MPO =  $73^\circ$  .  
 What is the measure of the angle LOP? \_\_\_\_\_ .  
 Are the measures of the two angles MPO and LOP equal? \_\_\_\_\_
  
3. The angles LOP and MOP are called ALTERNATE angles. Drag the point H to various positions. Are these angles LOP and MOP always equal? \_\_\_\_\_
  
4. Click on Tick Box 1 to show the wording of this theorem. Are the lines *a* and *b* parallel in this case? \_\_\_\_\_
  
5. Name another pair of alternate angles in the diagram.  
 (i) \_\_\_\_\_ (ii) \_\_\_\_\_  
 Write down the measure of these angles (i) \_\_\_\_\_ (ii) \_\_\_\_\_  
 Are the measures of these angles equal? \_\_\_\_\_
  
6. Click on Tick Box 2 to show the wording of the converse of this theorem.

7. If you were told that the line segments [KL] and [MG] were parallel what can we say about the measures of the following pairs of angles,

LOP and MOP \_\_\_\_\_

KOP and OPG \_\_\_\_\_

Drag the point H to make the angle MPO equal to  $50^\circ$  and then write down the measures of the following angles.

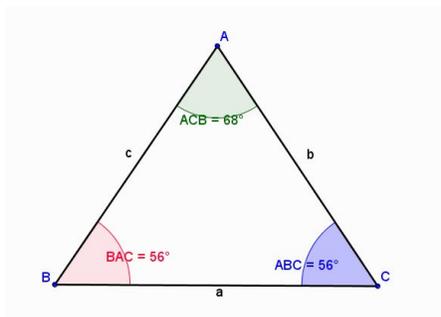
(i) LOP \_\_\_\_\_

(ii) KOP \_\_\_\_\_

(iii) GPO \_\_\_\_\_

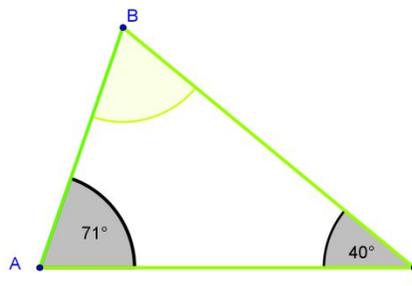
## Student Activity Theorem 4

Use in connection with interactive file “Theorem 4” on the Student’s CD.

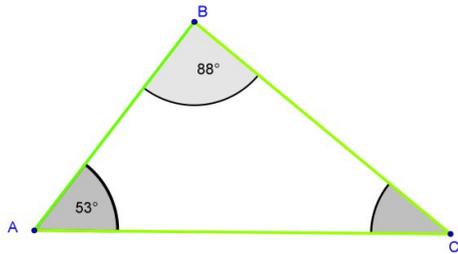
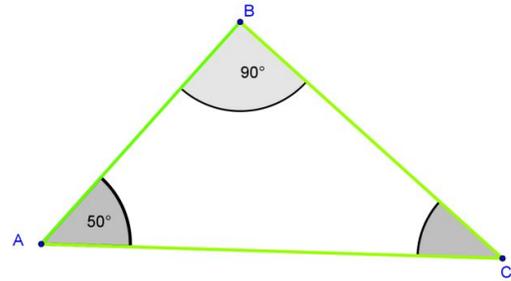
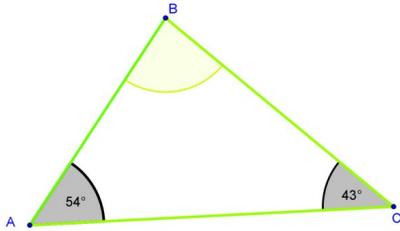


Give all answers correct to the nearest degree.

1. What shape is ABC? \_\_\_\_\_
2. How many sides make up the shape ABC? \_\_\_\_\_
3. Move the point B, so that the angle ABC equals  $58^\circ$ . What are the measures of the angle BCA and BAC.  $BCA =$  \_\_\_\_\_.  $BAC =$  \_\_\_\_\_.
4. When angle ABC equals  $58^\circ$  what is the sum of the measures of the angles ABC, BCA and BAC? Measure of ABC + Measure of BCA + Measure of BAC = \_\_\_\_\_
5. Move the point C, so that the angle BCA equals  $60^\circ$ . Read the values of the angle ABC and BAC.  $ABC =$  \_\_\_\_\_.  $BAC =$  \_\_\_\_\_.
6. When the angle BCA equals  $60^\circ$ , what is the sum of the values of the angles BCA, ABC and BAC? Measure of ABC + Measure of BCA + Measure of BAC = \_\_\_\_\_
7. Click on the Tick Box on the interactive file to reveal the wording of this theorem. Did you come to this conclusion? \_\_\_\_\_.
8. What is the measure of the angle ABC in each of the following triangles?

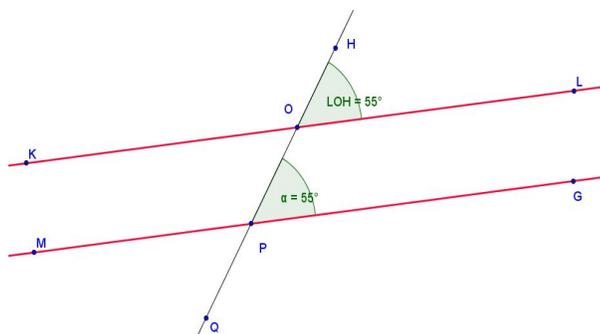


9. What are the values of the angles ACB in each of the following diagrams?



## Student Activity Theorem 5

Use in connection with interactive file “Theorem 5” on the Student’s CD.



1. What do you notice about the measure of the angles LOH and GPO? \_\_\_\_\_

Drag the point H to make the measure of the angle LOH =  $30^\circ$ .

Write down the measure of the angle GPO. GPO = \_\_\_\_\_

Are the measures of the two angles LOH and GPO equal in measure? \_\_\_\_\_.
2. Drag the point H to make the measure of the angle LOH =  $100^\circ$ .

What is the measure of the angle GPO? \_\_\_\_\_.

Are the measures of the two angles LOH and GPO equal? \_\_\_\_\_
3. The angles LOH and GOP are called CORRESPONDING angles. Drag the point H to various positions. Are these angles LOH and GOP always equal? \_\_\_\_\_
4. Click on Tick Box to show the wording of this theorem. Are the lines  $a$  and  $b$  parallel? \_\_\_\_\_
5. Name another pair of corresponding angles in the diagram.

(i) \_\_\_\_\_ (ii) \_\_\_\_\_

Write down the measure of these angles (i) \_\_\_\_\_ (ii) \_\_\_\_\_

Are the measures of these angles equal? \_\_\_\_\_

6. If you were told that the lines a and b are parallel what can we say about the measures of the following pairs of angles,

HOL and OPG \_\_\_\_\_

QPG and POL \_\_\_\_\_

QPM and POK \_\_\_\_\_

Drag the point H to make the angle OPG equal to  $90^\circ$  and then write down the measures of the following angles.

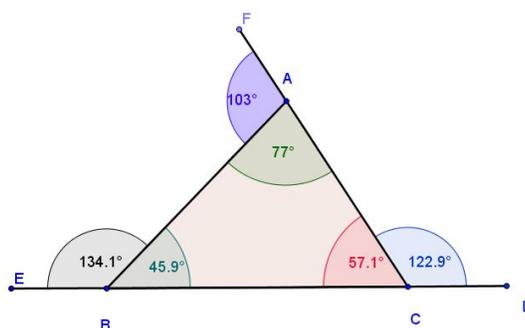
(i) KOH \_\_\_\_\_

(ii) MPO \_\_\_\_\_

(iii) QPG \_\_\_\_\_

## Student Activity Theorem 6

Use in connection with interactive file “Theorem 6” on the Student’s CD.



Give all answers correct to the nearest degree.

1. Drag the point A to make the measure of the angle  $EBA = 130^\circ$

What is the measure of the angle BAC? \_\_\_\_\_ .

What is the measure of the angle BCA? \_\_\_\_\_ .

What is the sum of the measures of the angles BAC and BCA?

Measure of the angle BAC + Measure of BCA = \_\_\_\_\_

Is this sum equal to the measure of the angle EBA? \_\_\_\_\_
2. Drag the point A to make the measure of the angle  $DCA = 100^\circ$  .

What is the measure of the angle CBA? \_\_\_\_\_ .

What is the measure of the angle CAB? \_\_\_\_\_ .

What is the sum of the measures of the angles CBA and CAB?

Measure of the angle CBA + Measure of CAB = \_\_\_\_\_

Is this sum equal to the measure of the angle DCA? \_\_\_\_\_
3. Drag the point A to make the measure of the angle  $FAB = 110^\circ$ .

What is the measure of the angle ABC? \_\_\_\_\_ .

What is the measure of the angle ACB? \_\_\_\_\_ .

What is the sum of the measures of the angles ABC and ACB? \_\_\_\_\_

Measure of the angle ABC + Measure of ACB = \_\_\_\_\_

Is this sum equal to the measure of the angle FAB? \_\_\_\_\_
4. Drag the point A to make the measure of the angle  $DCA = 84^\circ$ .

What is the measure of the angle CBA? \_\_\_\_\_ .

What is the measure of the angle CAB? \_\_\_\_\_ .

What is the sum of the measures of the angles CBA and CAB? \_\_\_\_\_

Measure of the angle CBA + Measure of CAB = \_\_\_\_\_

Is this sum equal to the measure of the angle DCA? \_\_\_\_\_

5. What conclusion can you deduce from the measurements in Q 1, Q2, Q3, and Q4.

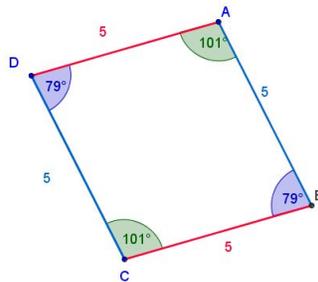
Conclusion. \_\_\_\_\_  
\_\_\_\_\_

6. Click on the Tick Box on the interactive file to reveal the wording of this theorem.

Did you come to this conclusion? \_\_\_\_\_.

## Student Activity Theorem 9

Use in connection with interactive file "Theorem 9" on the Student's CD.



1. In the diagram ABCD is a parallelogram. Drag the point A to the right and then write down the lengths of the following line segments

[AB] = \_\_\_\_\_

[DC] = \_\_\_\_\_

[DA] = \_\_\_\_\_

[BC] = \_\_\_\_\_

What can be concluded from these measurements?

---

2. In the diagram ABCD is a parallelogram. Drag the point D to the left and then write down the lengths of the following line segments

[AB] = \_\_\_\_\_

[DC] = \_\_\_\_\_

[DA] = \_\_\_\_\_

[BC] = \_\_\_\_\_

What can be concluded from these measurements?

---

3. In the diagram ABCD is a parallelogram. Drag the point A to the right and then write down the measures of the following angles

DAB = \_\_\_\_\_

DCB = \_\_\_\_\_

ADC = \_\_\_\_\_

ABC = \_\_\_\_\_

What can be concluded from these measurements?

---

4. In the diagram ABCD is a parallelogram. Drag the point D to the left and then write down the measures of the following angles

DAB = \_\_\_\_\_

DCB = \_\_\_\_\_

ADC = \_\_\_\_\_

ABC = \_\_\_\_\_

What can be concluded from these measurements?

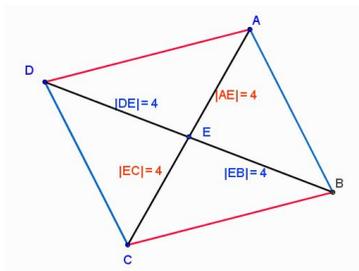
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5. Click on the Tick Box on the interactive file to reveal the wording of this theorem.

Did you come to this conclusion? \_\_\_\_\_.

## Student Activity Theorem 10

Use in connection with interactive file “Theorem 10” on the Student’s CD.



- ABCD is a parallelogram. Drag the point D to the left and then write down the lengths of the following line segments

[AE] = \_\_\_\_\_

[EC] = \_\_\_\_\_

[DE] = \_\_\_\_\_

[EB] = \_\_\_\_\_

Is the length of [AE] = the length of [EC]? \_\_\_\_\_

Is the length of [DE] = the length of [EB]? \_\_\_\_\_
- ABCD is a parallelogram. Drag the point A to the right and then write down the lengths of the following line segments

[AE] = \_\_\_\_\_

[EC] = \_\_\_\_\_

[DE] = \_\_\_\_\_

[EB] = \_\_\_\_\_

Is the length of [AE] = the length of [EC]? \_\_\_\_\_

Is the length of [DE] = the length of [EB]? \_\_\_\_\_
- ABCD is a parallelogram. Drag the point A to make the length of [AE] = 3

Is the length of [AE] = [EC]? \_\_\_\_\_

Is the length of [DE] = [EB]? \_\_\_\_\_
- Write down in your own words what conclusion can be drawn from the answers to questions 1, 2 and 3 \_\_\_\_\_

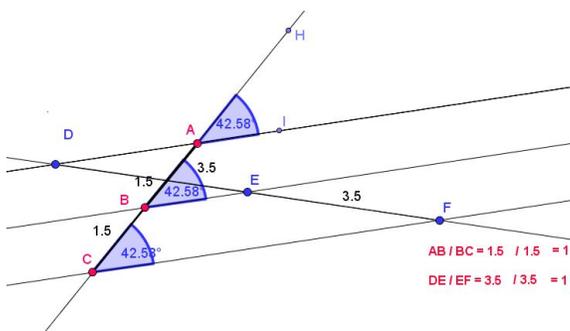
\_\_\_\_\_
- Click on the Tick Box on the interactive file to reveal the wording of this theorem.

Did you come to this conclusion? \_\_\_\_\_.

# Student Activity Theorem 11

Use in connection with interactive file “Theorem 11” on the Student’s CD.

**(Higher Level only)**



1. What is meant by parallel lines and name three sets of parallel lines in the interactive file?

---

2. How can you tell that the lines selected by you in Q.1 above are parallel in the interactive file?

---

3. What is meant by a transversal line and name two transversal lines in the interactive file?

---

4. What are the lengths of AB and BC in the interactive file? Are they equal?

---

5. What are the lengths of DE and EF in the interactive file? Are they equal?

---



---

6. Move the point A and see what the ratio of  $AB : BC$  is and calculate the ratio of  $DE : EF$  for the same location. Repeat for three different locations. Show calculations.

---



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---

7. Did you see a pattern develop in question 6 and if so explain it in your own words?

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8. Click on the Tick Box to show the wording of this theorem.

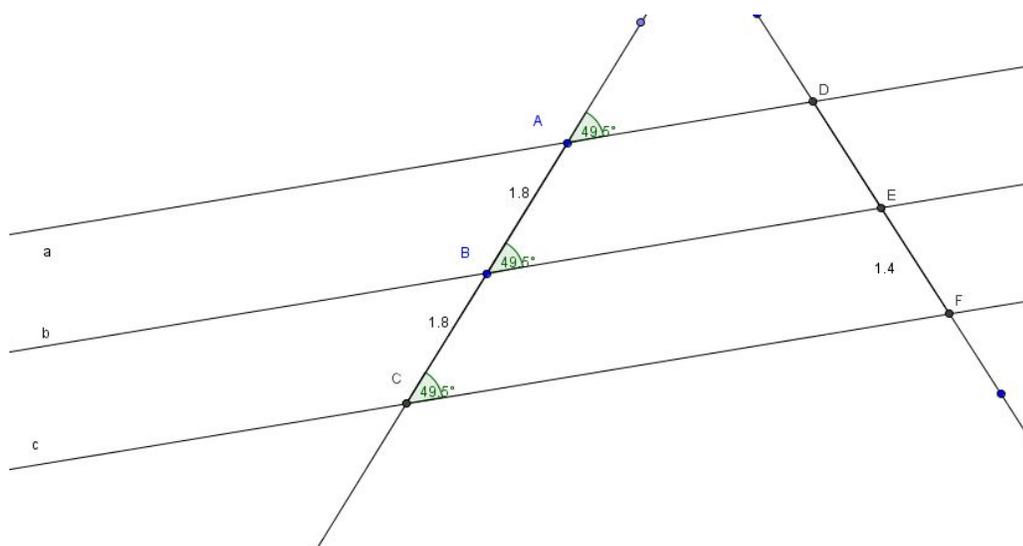
Explain in your own words the meaning of this theorem. \_\_\_\_\_

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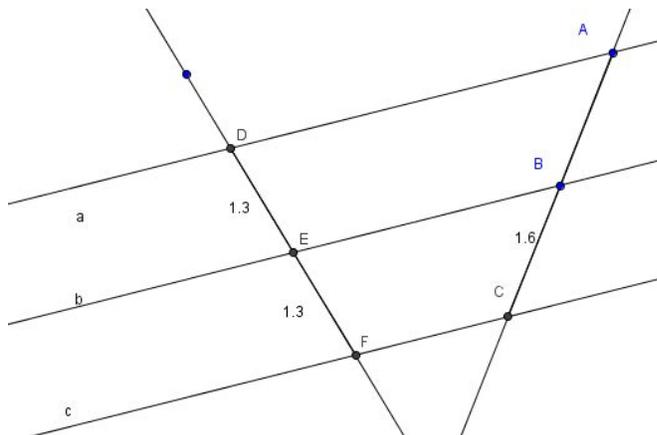
9. In the diagram below, if you know lines a, b and c are parallel, find the length of DE.



Explain your answer. \_\_\_\_\_

---

10. In the diagram below, if you know lines a, b and c are parallel, find the length of AB.



Explain your answer. \_\_\_\_\_

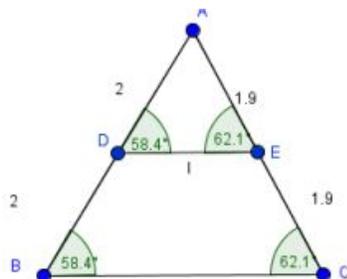
\_\_\_\_\_

\_\_\_\_\_

## Student Activity Theorem 12

Use in connection with interactive file “Theorem 12” on the Student’s CD.

**(Higher Level only)**



1. How can you tell, if the line I is parallel to the BC?

---



---

2. What is the length of AD and DB in the interactive file?

---



---

3. What is the value of AD/ DB?

---



---

4. What is the value of AE and EC and what is the value of AE/ EC?

---



---

5. Has AE/ EC the same value as AD/DB?

---



---

6. Move some of the points. What happens to the angles in the triangle ABC and the triangle ADE? Is there any relationship between them?

---



---

7. As you move the points, what happens to the ratios AE/ EC and AD/DB?

---



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8. What can you conclude from the answers to the questions above?

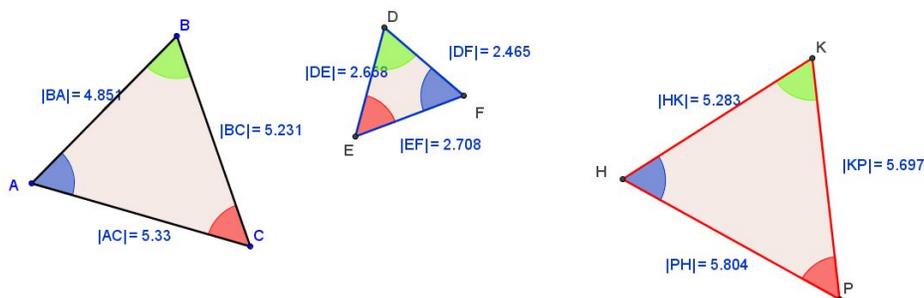
Conclusion \_\_\_\_\_  
\_\_\_\_\_

9. Click on the Tick Box on the interactive file to reveal the wording of this theorem.

Did you come to this conclusion? \_\_\_\_\_.

## Student Activity Theorem 13

Use in connection with interactive file “Theorem 13” on the Student’s CD.



Give answers correct to two decimal places

- The triangles ABC, DEF and HKP are equiangular. What does this mean?  
\_\_\_\_\_
- Name the sides across from (opposite) the following equal angles
  - Angle BAC , Opposite Side = \_\_\_\_\_      Angle EFD , Opposite Side = \_\_\_\_\_  
  
Angle KHP , Opposite Side = \_\_\_\_\_
  - Angle ABC , Opposite Side = \_\_\_\_\_      Angle EDF , Opposite Side = \_\_\_\_\_  
  
Angle HKP , Opposite Side = \_\_\_\_\_
  - Angle ACB , Opposite Side = \_\_\_\_\_      Angle DEF , Opposite Side = \_\_\_\_\_  
  
Angle HPK , Opposite Side = \_\_\_\_\_
- Sides across from equal angles are called corresponding sides.  
Complete the following.  
[AC] corresponds to [EF] and [HP],  
[AB] corresponds to \_\_\_\_\_ and \_\_\_\_\_,  
[BC] corresponds to \_\_\_\_\_ and \_\_\_\_\_.
- Write down the following ratios in decimal form (correct to two decimal places).  
(i)  $|AC| : |EF|$  \_\_\_\_\_      (ii)  $|BC| : |DE|$  \_\_\_\_\_      (iii)  $|AB| : |DF|$  \_\_\_\_\_
- Write down the following ratios in decimal form (correct to two decimal places).  
(i)  $|AC| : |HP|$  \_\_\_\_\_      (ii)  $|BC| : |KP|$  \_\_\_\_\_      (iii)  $|AB| : |HK|$  \_\_\_\_\_
- Write down the following ratios in decimal form (correct to two decimal places).  
(i)  $|EF| : |HP|$  \_\_\_\_\_      (ii)  $|DF| : |HK|$  \_\_\_\_\_      (iii)  $|DE| : |KP|$  \_\_\_\_\_

7. Move the point B and write down the ratios in questions 4, 5 and 6 again.

(i)  $|AC| : |EF|$  \_\_\_\_\_ (ii)  $|BC| : |DE|$  \_\_\_\_\_ (iii)  $|AB| : |DF|$  \_\_\_\_\_

(i)  $|AC| : |HP|$  \_\_\_\_\_ (ii)  $|BC| : |KP|$  \_\_\_\_\_ (iii)  $|AB| : |HK|$  \_\_\_\_\_

(i)  $|EF| : |HP|$  \_\_\_\_\_ (ii)  $|DF| : |HK|$  \_\_\_\_\_ (iii)  $|DE| : |KP|$  \_\_\_\_\_

8. Move the point B again to write down the same ratios again.

(i)  $|AC| : |EF|$  \_\_\_\_\_ (ii)  $|BC| : |DE|$  \_\_\_\_\_ (iii)  $|AB| : |DF|$  \_\_\_\_\_

(i)  $|AC| : |HP|$  \_\_\_\_\_ (ii)  $|BC| : |KP|$  \_\_\_\_\_ (iii)  $|AB| : |HK|$  \_\_\_\_\_

(i)  $|EF| : |HP|$  \_\_\_\_\_ (ii)  $|DF| : |HK|$  \_\_\_\_\_ (iii)  $|DE| : |KP|$  \_\_\_\_\_

9. What can you conclude from the calculations above.

Conclusion \_\_\_\_\_

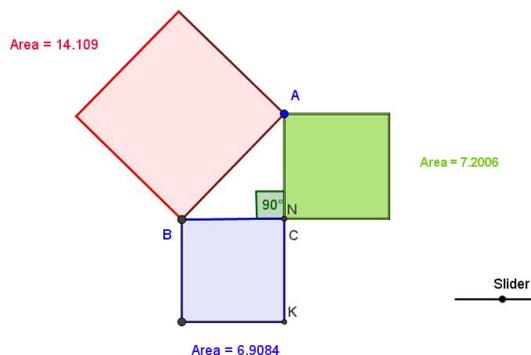
\_\_\_\_\_

10. Click on the Tick Box on the interactive file to reveal the wording of this theorem.

Did you come to this conclusion? \_\_\_\_\_.

## Student Activity Theorem 14

Use in connection with interactive file “Theorem 14” on the Student’s CD.



1. There are three squares built on the sides of the right angled triangle in the diagram. Write down the areas of the three squares.

Red Square \_\_\_\_\_

Blue Square \_\_\_\_\_

Green Square \_\_\_\_\_

Add the area of the Blue Square to the area of the Green Square

Area of Blue Square + Area of Green Square = \_\_\_\_\_

Does this total Area equal the Area of the Red Square? \_\_\_\_\_

2. Drag the slider to the left. Now write down the areas of the three squares.

Red Square \_\_\_\_\_

Blue Square \_\_\_\_\_

Green Square \_\_\_\_\_

Add the area of the Blue Square to the area of the Green Square

Area of Blue Square + Area of Green Square = \_\_\_\_\_

Does this total Area equal the Area of the Red Square? \_\_\_\_\_

3. Drag the slider to the right. Now write down the areas of the three squares.

Red Square \_\_\_\_\_

Blue Square \_\_\_\_\_

Green Square \_\_\_\_\_

Add the area of the Blue Square to the area of the Green Square

Area of Blue Square + Area of Green Square = \_\_\_\_\_

Does this total Area equal the Area of the Red Square? \_\_\_\_\_

4. Write down in your own words what conclusion can be drawn from the answers to questions 1, 2 and 3 \_\_\_\_\_  
\_\_\_\_\_

5. Click on the Tick Box on the interactive file to reveal the wording of this theorem.

Did you come to this conclusion? \_\_\_\_\_.

5. If the Area of the Red Square is  $a^2$ , the Area of the Blue Square is  $b^2$  and the Area of the Green Square is  $c^2$  can we conclude that

$$a^2 = b^2 + c^2 \quad \underline{\hspace{10em}}$$

6. If the Area of the Red Square is  $a^2$ , the Area of the Blue Square is  $b^2$  and the Area of the Green Square is  $c^2$  can we conclude that

$$b^2 = a^2 + c^2 \quad \underline{\hspace{10em}}$$

7. If the Area of the Red Square is  $r^2$ , the Area of the Blue Square is  $b^2$  and the Area of the Green Square is  $g^2$  can we conclude that

$$r^2 = b^2 + g^2 \quad \underline{\hspace{10em}}$$

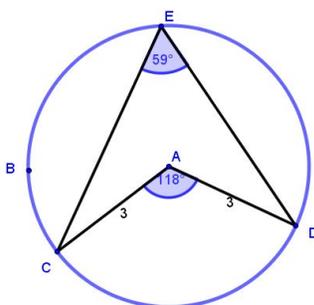




## Student Activity Theorem 19

Use in connection with interactive file “Theorem 19” on the Student’s CD.

**(Higher Level only)**



1. Name the two line segments that are the radii of the circle. \_\_\_\_\_
2. Name the centre of the circle. \_\_\_\_\_
3. Move the point B around, what do you notice about the relationship between  $|AC|$  and  $|AD|$ ? \_\_\_\_\_
4. Move the point D in the interactive file, so that the angle CAD is  $120^\circ$ . What is the measure of the angle CED? \_\_\_\_\_
5. Move the point D in the interactive file, so that the angle CAD is  $140^\circ$ . What is the measure of the angle CED? \_\_\_\_\_
6. Move the point D in the interactive file, so that the angle CAD is  $80^\circ$ . What is the measure of the angle CED? \_\_\_\_\_
7. Move the point D in the interactive file, so that the angle CED is  $50^\circ$ . What is the measure of the angle CAD? \_\_\_\_\_
8. Move the point D in the interactive file, so that the angle CED is  $70^\circ$ . What is the measure of the angle CAD? \_\_\_\_\_
9. What is the relationship between angle CAD and the angle CED?  
\_\_\_\_\_
10. Move B to the left and make the circle bigger, does the relationship between the angles CAD and CED change? \_\_\_\_\_ Explain. \_\_\_\_\_

11. Move B to the right and make the circle smaller, does the relationship between the angles CAD and CED change? \_\_\_\_\_ Explain. \_\_\_\_\_

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12. What can you conclude from the answers above?

Conclusion \_\_\_\_\_

13. Click on the Tick Box on the interactive file to reveal the wording of this theorem.

Did you come to this conclusion? \_\_\_\_\_.